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The Mineral Industry of Taiwan

UNITED STATES DEPARTMENT OF THE INTERIOR

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The Mineral Industry of Taiwan

By E. Chin[1]

Taiwan is an island with limited resources of minerals and fuels. The country's economy is based on imports of raw materials for processing into manufactures for export. In 1987, Taiwan's gross domestic product (GDP) at current prices was $88.6 billion.[2] The value of manufacturing, the largest component of the GDP, was $33.8 billion. The input of mining and quarrying, the smallest component, was only $456 million. The bulk of the value of the mining sector was the output of natural gas, condensate, and coal. The remaining value was from small operations of industrial minerals, dominated by dolomite, limestone, and marble.

The input of mining and quarrying to the GDP decreased from 0.53% in 1986 to 0.51% in 1987. In comparison, manufacturing accounted for 38.2% of the GDP in 1987, followed by commerce, 15.0%; Government services, 10.5%; agriculture, 6.1%; housing, 5.5%; transportation and communication, 5.2%; and other, 19.0%. The significance of the mining sector was expected to diminish further because of the decline in domestic coal output. Annual mine output of coal decreased from 2.6 million tons in 1980 to 1.9 million tons in 1985 and to less than 1.5 million tons in 1987.[3]

Taiwan's population in 1987 was 19.6 million with a labor force of 8.0 million. Employment by sector was as follows: agriculture, 1.2 million; industry, 3.4 million; and services, 3.4 million. Employment in the mining sector has declined, reflecting the drop in mining activity. Employment in the mining sector decreased from 67,000 in 1975 down to 56,000 in 1980, and dropped to 31,000 by 1987.

The average work month in mining was 180 hours compared with 210 hours for manufacturing. The average monthly salary in the mining sector was $630 compared with the highest average wage in the utility sector of $920, and the lowest average in the manufacturing sector of $485.

Owing to the Government's past program of promoting rapid growth of industry, the environment has suffered from pollution. The public has become increasingly sensitive to the problem and has insisted on corrective action. Local activism forced the delay in the construction of a titanium dioxide pigment plant and the expansion of Taiwan's nuclear power generation capacity.

PRODUCTION

Taiwan's mineral resource base is weak. By value, the most important mining sector in 1987 was mineral fuels. However, the domestic output of coal, natural gas, and oil was significant only in that it provided as much as 6% of the nation's supply of energy. Mine production of metallic minerals historically has been minor and sporadic. The last domestic production of metal ore, which was from a small copper mine in northern Taiwan, ended early in the decade. In terms of tonnage, the output of carbonate minerals dominated the remainder of the output of the domestic mining industry. In 1987, marble for dimension stone was valued as an export-earner while limestone quarrying was largely captive of the cement producers. The remainder of the output was an array of industrial minerals in minor quantities of asbestos, chiolite,

clays, feldspar, gem stones, mica, salt, serpentine, and talc.

State-owned enterprises produced all natural gas, oil, and salt, and essentially all dolomite and sulfur. Limestone was produced largely by the private sector, coal by a mix of state-owned and private companies, marble by a Government-promoted company for retired military personnel, and the remainder of minerals by small private companies.

The largest metal sector was iron and steel. The country's only integrated iron and steel complex was state-owned and accounted for 70% of the total raw steel output. Electrolytic copper was produced by a state-owned refinery that also produced gold and silver. Secondary metal recovery was primarily ferrous scrap from Taiwan's shipbreaking industry, the largest in the world.

Table 1.—Taiwan: Production of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity		1983	1984	1985	1986	1987[p]
METALS						
Copper: Metal, refined		37,960	48,436	46,734	50,439	46,961
Gold, primary	troy ounces	52,361	37,794	30,633	29,270	17,152
Iron and steel: Metal:						
Pig iron	thousand tons	3,415	3,360	3,429	3,740	[e]3,900
Ferroalloys:						
Ferromanganese		21,763	19,803	18,508	20,040	17,026
Ferrosilocomanganese		18,509	23,082	22,688	20,503	18,944
Ferrosilicon		18,304	28,714	17,272	14,007	7,058
Steel, crude	thousand tons	5,017	5,224	5,326	5,679	5,949
Lead, refinery, secondary[e]		38,000	44,300	44,400		
Silver, primary	troy ounces	345,273	364,274	366,078	405,521	315,382
INDUSTRIAL MINERALS						
Asbestos		2,819	1,355	625		
Cement, hydraulic	thousand tons	14,810	14,234	14,418	14,896	15,663
Clays:						
Fire clay		36,926	52,479	63,446	64,652	76,005
Kaolin		102,895	79,411	76,606	63,228	67,525
Feldspar		11,866	15,452	11,055	26,290	28,116
Gypsum:						
Precipitated		1,522	1,892	2,199	2,247	1,378
Other		1,500				
Lime		131,862	117,496	105,132	109,690	105,065
Mica		311	304	114	774	787
Nitrogen: N content of ammonia		310,594	268,427	206,781	265,248	243,275
Pyrite, gross weight				[e]8	10	
Salt, marine		79,188	218,491	173,898	136,078	99,943
Sodium compounds, n.e.s.:						
Caustic soda		295,349	350,527	386,505	365,913	378,244
Carbonate (soda ash)		93,820	107,210	112,018	133,358	127,332
Stone:						
Dolomite	thousand tons	228	258	231	258	340
Limestone	do.	13,183	12,936	12,722	12,462	12,407
Marble	do.	9,281	9,542	10,259	10,603	11,062
Serpentine	do.	116	123	208	234	253
Sulfur:						
S content of pyrite				4	5	
Byproduct, all sources		26,936	28,705	42,949	62,980	89,082
Total		26,936	28,7045	42,953	62,985	89,082
Talc		27,053	18,680	17,560	21,552	22,102
MINERAL FUELS AND RELATED MATERIALS						
Carbon black		32,968	39,842	43,264	48,363	53,559
Coal, bituminous	thousand tons	2,236	2,011	1,858	1,725	1,499
Coke	do.	150	141	132	148	118
Gas, natural:						
Gross[e]	million cubic feet	48,000	43,000	44,000	40,000	41,000
Marketed	do.	43,689	44,698	39,371	36,111	37,325

See footnotes at end of table.

Table 1.—Taiwan: Production of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity		1983	1984	1985	1986	1987[p]
MINERAL FUELS AND RELATED MATERIALS —Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	847	855	743	660	[e]650
Refinery products:						
Gasoline	do	17,422	17,518	25,408	18,128	18,500
Kerosene	do	86	61	282	956	950
Distillate fuel oil	do	21,898	21,972	23,852	19,480	19,500
Residual fuel oil	do	58,019	56,426	56,080	53,591	53,500
Lubricants	do	835	951	856	887	900
Asphalt	do	2,406	2,311	2,999	3,195	3,500
Other[2]	do	3,449	8,517	9,916	3,478	3,500
Refinery fuel, losses and not reported[e, 3]	do	27,000	27,000	30,000	25,000	25,000
Total	do	131,115	134,756	149,393	125,375	126,600

[e]Estimated. [p]Preliminary. [r]Revised.
[1]Includes data available through July 5, 1988.
[2]Naphtha, solvent oil, and base oil.
[3]Includes liquefied petroleum gas and jet fuel.

TRADE

The value of Taiwan's total trade in 1987 was $98.1 billion, comprising $59.6 billion for exports and $38.5 billion for imports. The United States was the largest export destination with shipments valued at $26.4 billion, followed by Japan, $7.7 billion; Hong Kong, $4.6 billion; the Federal Republic of Germany, $2.2 billion; Canada and the United Kingdom, $1.7 billion each, and Singapore, $1.5 billion. The remainder was scattered to a host of trading partner countries mostly on the Pacific rim.

Receipts from Japan were valued at $13.2 billion and from the United States, $8.5 billion. Other major import sources were the Federal Republic of Germany, $1.8 billion; Saudi Arabia, $1.2 billion; Australia, $1.1 billion; and Hong Kong, Kuwait, Malaysia, and the United Kingdom, each with less than $1.0 billion.

Electrical equipment and apparatus was the largest export class to the United States, valued at $7.3 billion, followed by textile and apparel, $3.2 billion; rubber and plastic products, $3.1 billion; metal products and manufactures, $2.3 billion; wood products, $1.4 billion; and miscellaneous manufactured products, $3.2 billion. The largest import classes from the United States were electrical equipment and apparatus, $1.6 billion; chemical and agricultural products, $1.3 billion each; and basic metals, $0.8 billion.

Taiwan's industrial strength lies in processing imported raw materials into finished goods and manufactures for export. Imports of minerals included iron ore valued at $147 million; copper ore, $62 million; manganese ore, $8.4 million; chromium ores, $0.7 million; and other ores and concentrates, $10.6 million. Imports of fuel products included coal, $663.6 million, and crude oil, $2,822.5 million.[4]

Table 2.—Taiwan: Exports and reexports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1985	1986	Destinations, 1986: United States	Destinations, 1986: Other (principal)
METALS				
Aluminum:				
Oxides and hydroxides	4,734	6,384		Republic of Korea 4,068; Panama 2,000
Metal including alloys, all forms	32,186	33,847	1,494	Japan 15,253; Hong Kong 12,912
Columbium and tantalum: Metal including alloys, all forms, tantalum	22	5	1	West Germany 2

See footnote at end of table.

Table 2.—Taiwan: Exports and reexports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986	Destinations, 1986	
			United States	Other (principal)
METALS —Continued				
Copper:				
Matte and speiss including cement copper	7	13		Japan 12.
Sulfate	161	270		Philippines 148; Spain 97.
Metal including alloys:				
Scrap	7,453	6,186	302	Japan 3,770; Netherlands 1,259.
Unwrought	90	49	2	Republic of Korea 39.
Semimanufactures	12,666	17,608	1,194	Singapore 2,857; Republic of Korea 1,591; Japan 1,451.
Gold: Waste and sweepings	21	19	19	
Iron and steel: Metal:				
Scrap	388,225	280,941	121	Thailand 224,795.
Pig iron, cast iron, related materials	2,186	4,766	2,824	Australia 524.
Ferroalloys	2,689	1,435	5	Japan 909; Republic of Korea 189.
Steel, primary forms	159,078	86,250	86	Japan 82,417.
Semimanufactures thousand tons	1,735	1,424	423	Japan 270; Hong Kong 151; Singapore 66.
Lead:				
Oxides		68		Indonesia 58; Thailand 10.
Metal including alloys, all forms	20,755	23,755	38	Japan 9,697; Republic of Korea 7,901.
Magnesium: Metal including alloys, all forms	466	572	58	Netherlands 307; Japan 200.
Manganese:				
Ore and concentrate	(2)	31		Republic of Korea 17; Indonesia 7.
Oxides		29		Philippines 17; Hong Kong 12.
Molybdenum: Metal including alloys, all forms kilograms	1,497	968	52	Indonesia 715; Hong Kong 200.
Nickel: Metal including alloys:				
Scrap	1,889	1,506		Japan 1,279.
Unwrought and semimanufactures	402	382	6	Australia 305.
Platinum-group metals:				
Waste and sweepings[3]	10	2	1	NA.
Metals including alloys, unwrought and partly wrought troy ounces	1,575	77,515	63,465	Malaysia 9,324.
Rare-earth metals including alloys, all forms	15	62		Singapore 44; Indonesia 18.
Silicon, high-purity	r1	3		India 1; Indonesia 1.
Silver:				
Waste and sweepings		2	1	Thailand 1.
Metal including alloys, unwrought and partly wrought troy ounces	30,543	39,995		United Kingdom 21,187; Hong Kong 7,780.
Tin:				
Oxides kilograms	267			
Metal including alloys, all forms	401	641	33	Hong Kong 311; Japan 88.
Titanium: Oxides	30	395	391	Nigeria 13.
Tungsten: Metal including alloys, all forms	63	8		Japan 7.
Uranium and/or thorium: Metal including alloys, all forms	65	298	185	Belgium-Luxembourg 20; Canada 19; France 15.
Zinc:				
Oxides	2,700	2,837		Japan 2,279.
Blue powder	182	14	3	Nigeria 8.
Metal including alloys, all forms	997	1,114	71	Hong Kong 108; Japan 73.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc	27	52	5	Thailand 33.
Artificial: Corundum	388	390	4	Japan 371.
Dust and powder of precious and semiprecious stones including diamond kilograms	9,155	23,553	11,921	Saudi Arabia 4,699; United Arab Emirates 1,575.
Grinding and polishing wheels and stones	2,724	3,182	1,149	Hong Kong 369; Thailand 336; Indonesia 303.
Boron materials: Oxides and acids kilograms	91	500		All to Indonesia.
Cement thousand tons	3,994	3,545	(3)	Hong Kong 1,536; Japan 941; Singapore 815.
Chalk		600		All to Indonesia.
Clays, crude	2,032	996		Philippines 628; Japan 199.

See footnotes at end of table.

Table 2.—Taiwan: Exports and reexports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986	Destinations, 1986: United States	Destinations, 1986: Other (principal)
INDUSTRIAL MINERALS —Continued				
Diamond:				
Natural:				
Gem, not set or strung: thousand carats	6,600	12,340	6,250	Netherlands 3,545; West Germany 1,580.
Industrial stones: do	34,800	12,440	8,150	Japan 4,010.
Synthetic:				
Gem, not set or strung: do	16,500	8,190	7,250	Italy 695.
Industrial stones: do	164,990	328,180	4,585	Thailand 146,825; Republic of Korea 138,845.
Diatomite and other infusorial earth	60	34	—	Malaysia 26.
Feldspar, fluorspar, related materials	12	166	—	Japan 58; Indonesia 55.
Fertilizer materials: Manufactured:				
Ammonia	34	17		All to Hong Kong.
Nitrogenous	1,025	905		Haiti 500; Japan 400.
Phosphatic	100	4,129	—	Fiji 2,000; Japan 1,108; Malaysia 1,000.
Potassic	12,600	25,855		Japan 17,600; Hong Kong 7,005.
Unspecified and mixed	2,455	5,368		Japan 2,999; Haiti 2,000.
Graphite, natural	188	205		Japan 113; Indonesia 53.
Gypsum and plaster	553	726	8	Indonesia 600.
Iodine: kilograms	2,379	1,400		India 725; Republic of Korea 450.
Magnesium compounds, unspecified		505		Indonesia 425.
Meerschaum, amber, jet: kilograms	25,389	5,082		Ireland 2,952 Philippines 549; Canada 478.
Mica, all forms	337	281		Japan 118; New Zealand 89; Indonesia 22.
Pigments, mineral: Iron oxides and hydroxides, processed	2	35	10	Indonesia 18.
Precious and semiprecious stones other than diamond:				
Natural: kilograms	104,073	131,696	17,972	Hong Kong 27,818; Thailand 26,694; Italy 16,360.
Synthetic: do	37,918	43,708	13,936	Italy 10,734; Hong Kong 4,504.
Salt and brine	1,472	1,950		All to Hong Kong.
Sodium compounds, n.e.s.: Sulfate, manufactured	31,292	23,984		Japan 8,928; Republic of Korea 4,575; Singapore 2,700.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	7,132	12,194	81	Japan 9,411; West Germany 343.
Worked	45,062	30,434	2,546	Saudi Arabia 20,174; Japan 4,029.
Dolomite, chiefly refractory-grade	47,250	82,116	NA	Japan 80,880.
Gravel and crushed rock	193,611	170,932	40	Japan 163,209.
Limestone other than dimension	10,129	9,094		Malaysia 4,700; Japan 3,720.
Quartz and quartzite		13		Japan 10.
Sand other than metal-bearing	337,972	309,555	7	Japan 308,816.
Sulfur:				
Elemental:				
Crude including native and byproduct	1,497	1,192		Indonesia 781; Philippines 312.
Colloidal, precipitated, sublimed	75	153		Indonesia 100; Australia 25.
Sulfuric acid	246	104		Hong Kong 37; Australia 30; Nigeria 19.
Talc, steatite, soapstone, pyrophyllite	509	695	—	Indonesia 448; Philippines 100.
Other:				
Crude	1,628	5,328	120	Thailand 3,223; Philippines 809.
Slag and dross, not metal-bearing	60,059	80,572	5	Japan 62,815; Philippines 11,165.
MINERAL FUELS AND RELATED MATERIALS				
Carbon black	9,281	10,023		Indonesia 7,587; Thailand 953.
Coal, all grades including briquets	(2)			
Coke and semicoke	9,364	13,257		Indonesia 6,432; Japan 3,838; Thailand 1,200.
Peat including briquets and litter	18	256		All to Japan.
Petroleum refinery products:				
Gasoline, motor: 42-gallon barrels	9	9	(3)	Mainly to Japan.
Mineral jelly and wax	551	39		Hong Kong 8; Nigeria 8; West Germany 8.
Kerosene and jet fuel: thousand 42-gallon barrels	11,210	9,785	379	Japan 4,750; Philippines 1,892.
Distillate fuel oil: do	7,932	8,246	NA	NA.
Lubricants: do	724	773	295	United Arab Emirates 133; Singapore 117.
Petroleum coke: do	(3)	508	408	Indonesia 314.

[r] Revised. NA Not available.
[1] Table prepared by Audrey D. Wilkes.
[2] Less than 1/2 unit.
[3] May include other precious metals.

Table 3.—Taiwan: Imports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1985	1986	Sources, 1986: United States	Sources, 1986: Other (principal)
METALS				
Aluminum:				
Ore and concentrate	19,518	47,261		All from Malaysia.
Oxides and hydroxides	7,680	5,725	208	Japan 4,982; Australia 325.
Metal including alloys:				
Scrap	6,287	13,055	9,144	Republic of South Africa 860; Australia 676.
Unwrought	147,204	155,956	12,532	Australia 66,044; Republic of South Africa 17,532; Canada 16,958.
Semimanufactures	32,293	32,440	583	Japan 12,712; Australia 8,652.
Antimony: Oxides	580	765	56	France 471; Japan 127.
Arsenic: Oxides and acids	368	563		France 529.
Cadmium: Oxides and hydroxides	249	476	(2)	Republic of Korea 383; Belgium-Luxembourg 72.
Chromium:				
Ore and concentrate	10,726	19,048	(2)	Republic of South Africa 17,967.
Oxides and hydroxides	1,938	2,881	397	Japan 1,344; West Germany 817.
Cobalt: Oxides and hydroxides	23	66	1	Belgium-Luxembourg 53.
Copper:				
Ore and concentrate	160,931	179,704	19,067	Canada 96,308; Chile 20,978; Mexico 19,441.
Sulfate	364	480	40	Japan 384.
Metal including alloys:				
Scrap	28,400	42,508	24,122	Hong Kong 6,892; Japan 3,335; Saudi Arabia 2,443.
Unwrought	47,665	109,476	1,424	Philippines 40,637; Japan 22,060; Chile 18,898.
Semimanufactures	41,378	58,075	3,001	Japan 38,627.
Gold:				
Bullion, thousand troy ounces	376,591	731,100		West Germany 309,891; Switzerland 260,154; Republic of South Africa 84,817.
Metal including alloys, unwrought and partly wrought, thousand troy ounces	1,109	886	266	Japan 617.
Iron and steel:				
Iron ore and concentrate:				
Excluding roasted pyrite, thousand tons	4,896	5,358	(2)	Australia 3,021; Brazil 1,835.
Pyrite, roasted	11,360	9,460		All from Philippines.
Metal:				
Scrap	694,665	1,225,472	776,431	Hong Kong 133,828; Japan 96,031.
Pig iron, cast iron, related materials	180,392	319,790	1,394	Brazil 226,451; Japan 61,456.
Ferroalloys	16,159	51,540	60	Republic of South Africa 32,583; Philippines 6,128.
Steel, primary forms	242,559	600,668	88	Brazil 231,723; Japan 148,078; Republic of South Africa 114,204.
Semimanufactures, thousand tons	1,196	1,900	49	Japan 1,557.
Lead:				
Ore and concentrate	(2)			
Oxides	2,754	2,935	(2)	Australia 2,323; West Germany 493.
Metal including alloys:				
Scrap	54,839	89,536	54,602	Saudi Arabia 10,043; Australia 9,576.
Unwrought	12,272	16,154	1,658	Australia 8,464; Japan 3,365; Peru 2,246.
Semimanufactures	29	19	6	Japan 13.
Magnesium: Metal including alloys, all forms	720	951	206	Norway 507.
Manganese:				
Ore and concentrate	128,970	119,241	6	Republic of South Africa 58,072; Gabon 32,500; Australia 19,181.
Oxides	1,624	2,625	2	India 923; Japan 697; Republic of South Africa 476.
Metal including alloys, all forms	35	35	1	Republic of South Africa 19; United Kingdom 14.
Mercury, 76-pound flasks	290	282	136	Japan 131.
Molybdenum: Metal including alloys, all forms	60	85	49	West Germany 28.
Nickel:				
Matte and speiss	2,938	11,514		Canada 9,362; Japan 1,853.
Metal including alloys:				
Scrap	396	1,223	638	Canada 391; Netherlands 189.
Unwrought	3,863	6,535	29	Canada 3,279; Norway 1,529.
Semimanufactures	302	691	48	Canada 186; Japan 104; Australia 103.

See footnotes at end of table.

Table 3.—Taiwan: Imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986	Sources, 1986: United States	Sources, 1986: Other (principal)
METALS—Continued				
Platinum-group metals:				
Ore and concentrate[3] value, thousands	$45	$78		All from United Kingdom.
Metals, including alloys, unwrought and partly wrought thousand troy ounces	69	19	8	Japan 10.
Rare-earth metals including alloys, all forms	178	178	37	Japan 109.
Selenium, elemental	34	27	[2]	Japan 19; United Kingdom 5.
Silicon, high purity	1,609	2,698	4	Canada 1,144; Norway 1,008.
Silver:				
Waste and sweepings[3] value, thousands	$387	$61	$59	West Germany $1.
Metal, including alloys, unwrought and partly wrought thousand troy ounces	1,515	2,403	280	Japan 886; Australia 435.
Tin: Metal including alloys, all forms	2,099	4,938	13	Malaysia 3,113; Thailand 822.
Titanium: Oxides	9,950	13,187	404	Japan 6,191; West Germany 3,914.
Tungsten: Metal including alloys, all forms	46	56	20	Japan 29.
Uranium and/or thorium: Oxides and other compounds	20	38	2	France 14; Norway 11.
Zinc:				
Oxides	210	326	19	Japan 213; Republic of Korea 65.
Blue powder	244	206	1	West Germany 54; Greece 40; United Kingdom 39.
Metal including alloys:				
Scrap	19,837	69,369	49,769	West Germany 7,636; Canada 4,009.
Unwrought	54,423	79,000	161	Australia 36,608; Canada 14,219; Japan 10,379.
Semimanufactures	784	927	4	Japan 770.
Other:				
Oxides and hydroxides	330	1,519	70	Australia 1,192.
Ashes and residues	19,013	28,021	8,979	Australia 5,110; Japan 3,978; Canada 3,232.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc	2,726	4,533	486	Japan 1,745; Indonesia 1,245.
Artificial: Corundum	8,779	18,218	432	Japan 9,869; Hong Kong 4,455; Brazil 1,520.
Asbestos, crude	24,519	39,735	4,466	Canada 17,025; Republic of South Africa 14,020.
Barite and witherite	4,131	6,636		Thailand 6,635.
Boron materials:				
Crude natural borates	2,142	2,745		Japan 1,304; Netherlands 600.
Oxides and acids	1,684	2,019	1,775	Italy 162.
Bromine	14	[2]		Mainly from Japan.
Cement	5,232	10,053	[2]	Japan 5,578; Denmark 2,869.
Clays, crude:				
Bentonite	16,623	18,624	15,528	Republic of South Africa 1,248; India 1,025.
Fire clay	457	632		All from Japan.
Kaolin	80,129	120,134	49,760	Indonesia 26,475; Malaysia 13,627; Japan 10,946.
Unspecified	128,817	158,808	7,939	Hong Kong 97,795; Japan 31,758.
Cryolite and chiolite	216	108		Mainly from Denmark.
Diamond:				
Natural:				
Gem, not set or strung thousand carats	[4]105	1,270		Mainly from Republic of South Africa.
Industrial stones do	[4]620	1,580	[2]	Japan 1,570.
Synthetic:				
Gem, not set or strung do	885	1,155		Mainly from Hong Kong.
Industrial stones do	2,075	820	45	Japan 560.
Diatomite and other infusorial earth	3,544	4,296	3,036	Japan 655.
Feldspar, fluorspar, related materials	140,593	158,131	703	Thailand 49,183; Hong Kong 48,635; Japan 29,111.
Fertilizer materials: Manufactured:				
Ammonia	153,528	155,287	35,434	Indonesia 47,473; Australia 20,504.
Nitrogenous	176,530	122,131	[2]	Saudi Arabia 118,184.
Phosphatic	64	110		Republic of South Africa 91.
Potassic	130,566	212,492	36,886	Israel 61,600; Canada 60,906; Jordan 34,050.
Unspecified and mixed	8,218	2,202	278	Japan 789; West Germany 499.

See footnotes at end of table.

Table 3.—Taiwan: Imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1985	1986	Sources, 1986: United States	Sources, 1986: Other (principal)
INDUSTRIAL MINERALS —Continued				
Graphite, natural	8,428	8,513	21	Republic of Korea 6,530; Sri Lanka 684; Japan 525.
Gypsum and plaster	411,838	401,118	637	Thailand 313,914; Japan 57,170.
Iodine	35	23		Mainly from Japan.
Magnesium compounds:				
Oxides and hydroxides	r8,592	29,016	221	India 11,425; Japan 9,184; Malaysia 4,700.
Other	20,242	8,698	35	India 5,150; Malaysia 2,420.
Mica:				
Crude including splittings and waste	193	445	3	Malaysia 286; India 109.
Worked including agglomerated splittings	452	192	5	Japan 173.
Phosphates, crude	308,858	330,763	(2)	Jordan 223,598; Morocco 60,857; Israel 41,288.
Phosphorus, elemental	1,404	2,899	1,461	Republic of South Africa 1,375.
Pigments, mineral:				
Natural, crude	10	5		Japan 3.
Iron oxides and hydroxides, processed	16,694	22,397	398	Japan 15,611; West Germany 1,750.
Precious and semiprecious stones other than diamond:				
Natural	3,166	7,616	75	Brazil 3,627; Republic of South Africa 2,462.
Synthetic	13	10	1	Japan 4; Belgium-Luxembourg 2.
Salt and brine	805,115	859,515	19	Australia 802,274.
Sodium compounds, n.e.s.: Carbonate, natural and manufactured	17,564	31,100	26,581	Kenya 4,500.
Stone, sand and gravel:				
Dimension stone: Crude and partly worked	45,829	66,742	96	India 19,033; Italy 13,647; Spain 9,471.
Dolomite, chiefly refractory-grade	2,052	3,340	68	United Kingdom 1,856; Thailand 963.
Limestone other than dimension	20	22,080	(2)	Philippines 21,759.
Quartz and quartzite	2,103	1,573	11	India 640; Hong Kong 290.
Sand other than metal-bearing	9,459	10,726	135	Malaysia 7,718; Japan 1,625.
Sulfur:				
Elemental:				
Crude including native and by product	74,955	60,515	13,098	Canada 47,287.
Colloidal, precipitated, sublimed	158,334	261,370	35,578	Canada 216,762.
Sulfuric acid	98,406	125,521	138	Japan 125,355.
Talc, steatite, soapstone, pyrophyllite	10,744	12,230	1,777	Republic of Korea 5,613; Thailand 2,240.
Vermiculite	461	1,146		United Kingdom 480; Republic of South Africa 378; India 270.
Other:				
Crude	118,000	112,003	1,503	Republic of Korea 83,600; Japan 10,934.
Slag and dross, not metal-bearing	16,775	14,460	73	Japan 14,241.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	155	98	98	
Carbon black	4,601	9,265	2,347	Australia 3,594; Japan 1,745.
Coal, all grades including briquets: thousand tons	10,270	11,003	3,111	Australia 5,088; Republic of South Africa 2,026.
Coke and semicoke	172,957	157,722		Japan 157,679.
Peat including briquets and litter	209	396		Finland 175; Sweden 66; West Germany 59.
Petroleum:				
Crude: thousand 42-gallon barrels	119,944	126,337		Saudi Arabia 45,777; Kuwait 23,781; United Arab Emirates 13,200.
Refinery products:				
Liquefied petroleum gas: do	4,429	6,638		Saudi Arabia 4,444 Kuwait 840.
Mineral jelly and wax: do	109	158	31	Japan 76; Indonesia 14.
Distillate fuel oil: do	3,965	12,089	1	United Kingdom 10,233; Spain 1,110.
Lubricants: do	457	596	202	Japan 223.
Nonlubricating oils: do	127	995	85	Singapore 370; Republic of Korea 217; Philippines 195.
Petroleum coke: do	188	557	497	Japan 39.

rRevised.
[1]Table prepared by Audrey D. Wilkes.
[2]Less than 1/2 unit.
[3]May include other precious metals.
[4]Excludes unreported quantity valued at $1,159,300.
[5]Excludes unreported quantity valued at $80,400.

COMMODITY REVIEW

METALS

Taiwan's primary metals industry was limited to copper and iron and steel. Primary aluminum metal production by Taiwan Aluminium Corp. (Talco) ceased in 1982. The Government transferred Talco to the state-owned Taiwan Power Co. (Taipower), which was to continue the rolling operation to produce aluminum sheet and foil from imported ingot.

Copper.—Taiwan Metal Mining Corp. (TMMCO), a state-owned enterprise, had a 50,000-ton-per-year copper smelter-refinery at Juifang. Because of mounting debts, TMMCO's plant facilities were transferred to Taipower in 1987, which continued the production of copper, gold, and silver. Taipower was to continue the operation of the smelter-refinery for the next 10 years but was to sell off the other assets of TMMCO to the private sector.

Iron and Steel.—China Steel Corp. (CSC), a state-owned enterprise, operated the country's only integrated iron and steel complex at Kaohsiung. In late 1987, the installation of blast furnace No. 3 was completed, fulfilling the third-stage expansion of the complex. CSC's annual production capacity of raw steel was increased from 3.2 million to 5.6 million tons. In 1987, CSC produced 56% of the nation's raw steel. It was expected to account for 76% of the raw steel output capacity in 1988.

Tang Eng Iron Works Co. Ltd. (Tang Eng), a state-owned enterprise, specialized in stainless steel production. Talent Metals Corp., which operated a 7,000-ton-per-year nickel smelter at Kaohsiung, went into receivership in 1987 and was reorganized by the Government into Taiwan Nickel Refining Co. (TaiNickel). TaiNickel was to continue to provide nickel to Tang Eng for the production of stainless steel.

In addition to private companies such as Tung Ho Steel Enterprises Inc. and Long Ching Steel Co. Ltd., there were numerous small mills operating electric furnaces and rolling facilities.

Taiwan's steel industry was dependent on foreign sources for raw materials. Iron ore was imported primarily from Australia, manganese ore from the Republic of South Africa, and coking coal from Australia. Scrap metal is produced from shipbreaking.

INDUSTRIAL MINERALS

Small quantities of asbestos, clays, feldspar, gem stones, mica, pyrite, quartz crystal, serpentine, and talc were produced by local mines. Salt was produced from evaporites by Government-owned operations. Most of the dolomite production was from captive mines of the privately owned cement producers. Cement production by 11 companies increased 6% to 15.7 million tons in 1987. Two Government-owned companies produced 1.3 million tons of compound fertilizers.

MINERAL FUELS

Taiwan's supply of primary energy was 41.6 million kiloliters in terms of oil equivalence. Domestic energy production from nuclear power accounted for 16% of the supply; hydropower, 4.4%; natural gas, 2.9%; coal, 2.8%; and oil, 0.2%. The remainder of primary energy was supplied by imports of coal, crude oil, and petroleum products.

Taiwan produced modest quantities of natural gas and associated condensate. Coal production was less than 1.5 million tons in 1987, and future output was expected to decline because of depleted resources and the closure of hazardous mines.

To increase domestic energy production, Taipower planned a fourth nuclear power station, housing reactors 7 and 8, on the northeast coast. If construction is blocked for environmental reasons, Taipower plans to construct four fossil-fuel-fired powerplants.[5]

In a further attempt to diversify energy production, Taipower planned to construct an experimental energy conversion plant in 1995. This plant would utilize energy from differential temperature gradients of seawater.

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[1]Physical scientist, Division of International Minerals.

[2]Where necessary, values have been converted from New Taiwan dollars (NT$) to U.S. dollars at the rate of NT$28.55 = US$1.00 in 1987.

[3]Council for Economic Planning and Development (Taipei). Industry of Free China. V. 69, No. 2, Feb. 1988, 206 pp.

[4]Executive Yuan (Taipei). Monthly Statistics of the Republic of China. No. 266, Feb. 1988, 213 pp.

[5]American Institute in Taiwan (Taipei). State Dep. Airgram A-018, Dec. 18, 1987.

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